Claims:

1. A light applicator with a diffusor (1) which is attachable to a light guide (2) and in which different diffusion regions (7, 8, 9) with different scattering parameters follow successively along the optical axis (6) of the light guide (2) prolongated into the diffuser (1)
characterized in that the diffusion regions (7, 8, 9) will overlap with respect to a line-of-sight aligned at a right angle to the optical axis (6) of the light guide (2).

2. A light applicator according to claim 1, wherein the boundary surfaces (11, 12) are formed in a paraboloidal way between the diffusion regions (7, 8, 9).

3. A light applicator according to claim 1, wherein the boundary surfaces (11, 12) are formed in a conical way between adjacent diffusion regions (7, 8, 9).

4. A light applicator according to one of the claims 1 to 3, whose diffusor (1) comprises a mirror element (14) at its distal end (10).

5. A light applicator according to one of the claims 1 to 4, wherein the scattering probability increases towards the distal end (10) due to the chosen scattering parameters in the diffusion regions (7, 8, 9).

6. A light applicator according to claim 5, wherein the concentration of scattering centers as averaged over the cross-sectional surface area increases along the optical axis (6) towards the distal end (10) of the diffusor (1).

7. A light applicator according to one of the claims 1 to 6, whose diffusor (1) has a homogeneous distribution of light along the optical axis as a result of the scattering parameters in the diffusion regions (7, 8, 9).

8. A light applicator according to one of the claims 1 to 7, wherein the diffusor (1) is associated with a reflection element (26, 30) by which the light emitted by the diffusor (s) can be guided in a predetermined direction.

9. A light applicator according to claim 8, wherein the reflection element is a spherical segment (26) which is applied on the diffusor (1) and which is provided on one outer side with a layer (30) reflecting the light.

10. A light applicator according to claim 9, wherein the transition (33) between the light-emitting surface (29) of the reflection element (26, 30) and the light-emitting surface (28) of the diffusor (1) is provided with a configuration which is specific to the organ.

11. A light applicator according to one of the claims 8 to 10, wherein the distribution of the power density of the light emitted by the diffuser (1) along the optical axis (6) has a local maximum in the region of the reflection element (26, 30) as a result of the chosen scattering parameters in the proximal diffusion regions (7, 8).

12. A light applicator according to claim 11, wherein the concentration of the scattering centers as averaged over the cross section has a local maximum in the region of the reflection element (26, 30).

13. A light applicator according to claim 11 or 12, wherein the concentration of scattering centers along the optical axis (6) as averaged over the cross-sectional surface area shows a minimum between the proximal end (4) and the distal end (10) of the diffusor (1).

14. A light applicator according to one of the claims 8 to 13, wherein the distribution of light through the light-

emitting surface (29) of the reflection element (26, 30) and through the light-emitting surface (28) of the diffusor (1) is homogeneous.

15. A light applicator according to one of the claims 1 to 14, wherein the diffusion regions (7, 8, 9) are produced on the basis of silicone.

16. A light applicator according to one of the claims 1 to 15, wherein scattering centers present in the diffusion regions (7, 8, 9) are produced on the basis of TiO_2 or $BaSO_4$.

17. A light applicator according to one of the claims 1 to 16, wherein the diffusion regions (7, 8, 9) are enclosed by a covering which has a smaller refractive index than the refractive index of the diffusion regions (7, 8, 9).

18. A light applicator according to one of the claims 1 to 17, whose light-emitting surfaces (28, 29) are covered by a partly backscattering layer (34).

19. A light applicator according to one of the claims 1 to 18, whose diffusor (1) is provided with a flexible configuration.

20. A light applicator according to one of the claims 1 to 18, whose diffusor (1) is provided with a rigid configuration.

21. A method for producing a diffusor (1) which is connectable to a light guide (2) and in which different diffusion regions (7, 8, 9) with different scattering parameters are formed along the axis (6) of the light guide prolongated into the diffusor (1), **characterized in that**

- a hollow body (5) is used for the diffusor (1) which is filled in sections with a first diffusion medium (15), and that

- a second diffusion medium (19) is injected into the first diffusion medium (15).

22. A method according to claim 21, wherein the first diffusion medium (15) and the second diffusion medium (19) are each sucked into the hollow body (5).

23. A method according to claim 21 or 22,wherein in the first diffusion medium (15) a paraboloidal boundary surface (11) is formed between the first diffusion medium (15) and the second diffusion medium (19) as a result of the laminar flow of the second diffusion medium (19).

24. A method according to one of the claims 21 to 23, wherein the second diffusion medium (19) is injected from a first end (10) of the hollow body (5) into the first diffusion medium (15) and the third diffusion medium (24) is injected from a second end (4) of the hollow body (5) into the first diffusion medium (15).

25. A method according to one of the claims 21 to 24, wherein the diffusion media (15, 19, 24) are cured.